

§ 434.603 Determination of the design energy use.

603.1 The Design Energy Use shall be calculated by modeling the Proposed Design using the same methods, assumptions, climate data, and simulation tool as were used to establish the Energy Use Budget, but with the design

features that will be used in the final building design. The simulation tool used shall segregate the calculated energy consumption by fuel type giving an annual Design Energy Use for each fuel. The sum of the Design Energy Uses multiplied by the fuel conversion factors in Table 602.2 yields the Design Energy Use for the proposed design:

$$DEU = DEU_1xf_1 + DEU_2xf_2 + \dots + DEU_ixf_i \quad \text{Equation 603.1}$$

Where f_1, f_2, \dots, f_i are the fuel conversion factors in Table 602.2.

603.2 Required Life Cycle Cost Analysis for Fuel Selection.

603.2.1 Fuel sources selected for the Proposed Design and Prototype or Reference buildings shall be determined by considering the energy cost and other costs and cost savings that occur during the expected economic life of the alternative.

603.2.2 The designer shall use the procedures set forth in subpart A of 10 CFR part 436 to make this determination. The fuel selection life cycle cost analysis shall include the following steps:

603.2.2.1 Determine the feasible alternatives for energy sources of the Proposed Design's HVAC systems, service hot water, and process loads.

603.2.2.2 Model the Proposed Design including the alternative HVAC and service water systems and conduct an annual energy analysis for each fuel source alternative using the simulation tool specified in this section. The annual energy analysis shall be computed on a monthly basis in conformance with subpart E with the exception that all process loads shall be included in the calculation. Separate the output of the analysis by fuel type.

603.2.2.3 Determine the unit price of each fuel using information from the utility or other reliable local source. During rapid changes in fuel prices it is recommended that an average fuel price for the previous twelve months be used in lieu of the current price. Calculate the annual energy cost of each energy source alternative in accordance with procedures in subpart E for

the Design Energy Cost. Estimate the initial cost of the HVAC and service water systems and other initial costs such as energy distribution lines and service connection fees associated with each fuel source alternative. Estimate other costs and benefits for each alternative including, but not necessarily limited to, annual maintenance and repair, periodic and one time major repairs and replacements and salvage of the energy and service water systems. Cost estimates shall be prepared using professionally recognized cost estimating tools, guides and techniques.

603.2.2.4 Perform a life cycle cost analysis using the procedure specified in subsection 603.2.

603.2.2.5 Compare the total life cycle cost of each energy source alternative. The alternative with the lowest total life cycle cost shall be chosen as the energy source for the proposed design.

§ 434.604 Compliance.

604.1 Compliance with this section is demonstrated if the Design Energy Use is equal to or less than the Energy Use Budget.

$$DEU < EUB \quad \text{Equation 604.1}$$

604.2 The energy consumption shall be measured at the building five foot line for all fuels. Energy consumed from non-depletable energy sources and heat recovery systems shall not be included in the Design Energy Use calculations. The thermal efficiency of fixtures, equipment, systems or plants in the proposed design shall be simulated by the selected calculation tool.